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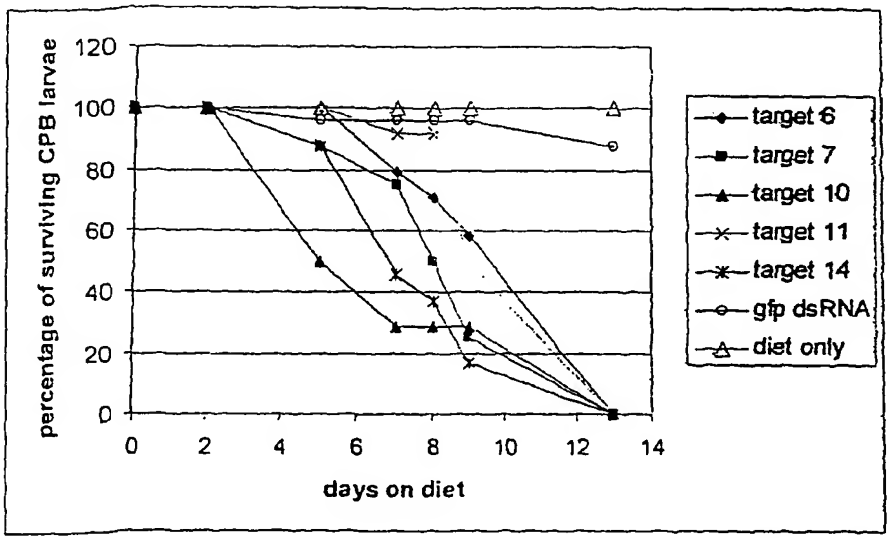
[Continued on next page]

(54) Title: METHODS FOR CONTROLLING PESTS USING RNAI



(57) Abstract: The present invention relates to methods for controlling pest infestation using double stranded RNA molecules. The invention provides methods for producing transgenic cells expressing the double stranded RNA molecules, as well as compositions and commodity products containing or treated with such molecules.

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(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2006/004008

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N15/82 A01H5/00 C12N5/10 C12N15/12 C12N15/11

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C12N A01H C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, Sequence Search, WPI Data, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE UniProt [Online] 30 August 2005 (2005-08-30), "Ribosomal protein S4e." XP002432593 retrieved from EBI accession no. UNIPROT:Q4GXU7 Database accession no. Q4GXU7 abstract	1,2,5,6
X	& DATABASE EMBL SEQUENCE LIBRARY [Online] Ebi. hinxton; ribosomal protein S4e; rpS4e gene 16 July 2005 (2005-07-16), LONGHORN,S.J.: "Biphyllus lunatus mRNA for ribosomal protein S4e" retrieved from EBI. HINXTON accession no. www.ebi.co.uk Database accession no. AM048926 abstract	1,2,5,6

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[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
7 September 2007	20/11/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Holtorf, Sönke

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2005/019408 A (BAR ILAN UNIVERSITY; HAZERA GENETICS LTD; RAHAN MERISTEM LTD; MICHAEL) 3 March 2005 (2005-03-03) the whole document	
A	WO 01/34815 A (CAMBRIA BIOSCIENCES, LLC) 17 May 2001 (2001-05-17) the whole document	
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SOARES C A G ET AL: "Capillary feeding of specific dsRNA induces silencing of the isac gene in nymphal Ixodes scapularis ticks" INSECT MOLECULAR BIOLOGY, vol. 14, no. 4, August 2005 (2005-08), pages 443-452, XP002446932 ISSN: 0962-1075 the whole document figure 2	
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2006/004008

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

As currently drafted, Claims 16-18 are directed to a method of treatment of the human/animal body. The search has been carried out and based on the alleged effects of the compound/composition.

2. [ ] Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. [X] No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-13, 16-18 partially

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Invention1: claims 1-13,16-18 partially

Isolated Leptinotarsa-specific nucleotide sequence as characterized by SEQID1; double stranded ribonucleotide sequence produced by expressing said SEQID1; cell transfomed by said sequence, a food product comprising said cell; a composition comprising said polynucleotide; a method for controlling pest infestation comprising exposing said pest to said composition; a pesticide comprising said polynucleotide; use of said polynucleotide sequence, the dsRNa , the cell, the composition or said pesticide to prevent or treat an insect or nematode infestation or a fungal infection.

Inventions 2-149: claims 1-13,16-18 partially

as invention 1, but limited to the Leptinotarsa-specific SEQIDs 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 49 to 158, 159, 160-163, 168, 173, 178, 183, 188, 193, 198, 203, 208, 215, 220, 225, 230, 240 to 246 and 2486.

Invention 150: claims 1-13,16-18 partially

as invention 1, but limited to the Phaedon-specific nucleotide sequences as characterized by SEQIDs 247, 249, 251, 253, 255, 257, 259, 275 to 472, 473, 478, 483, 488, 493, 498, 503, 508 to 512 and the use for Phaedon-specific infestation in plants.

Invention 151: claims 1-13,16-18 partially

as invention 1, but limited to the Epilachna-specific nucleotide sequences as characterized by SEQIDs 513, 515, 517, 519, 521, 533 to 575, 576, 581, 586, 591 or 596 and the use for Epilachna-specific infestation in plants.

Invention 152: claims 1-13,16-18 partially

as invention 1, but limited to the Anthonomus-specific nucleotide sequences as characterized by SEQIDs 601, 603, 605, 607, 609, 621 to 767, 768, 773, 778, 783 or 788 and the use for Anthonomus-specific infestation in plants.

Invention 153: claims 1-13,16-18 partially

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

as invention 1, but limited to the Tribolium-specific nucleotide sequences as characterized by SEQIDs 793, 795, 797, 799, 801, 813 to 862, 863, 868, 873, 878 or 883 and the use for Tribolium-specific infestations.

Invention 154: claims 1-13,16-18 partially

as invention 1, but limited to the Myzus-specific nucleotide sequences as characterized by SEQIDs 888, 890, 892, 894, 896, 908 to 1040, 1041, 1046, 1051, 1056, 1061, or 1066 to 1070 and the use for Myzus-specific infestation in plants.

Invention 155: claims 1-13,16-18 partially

as invention 1, but limited to the Nilaparvata-specific nucleotide sequences as characterized by SEQIDs 1071, 1073, 1075, 1077, 1079, 1081, 1083, 1085, 1087, 1089, 1091, 1093, 1095, 1097, 1099, 1101, 1103, 1105, 1107, 1109,1111, 1113, 1161 to 1571, 1572, 1577, 1582, 1587, 1592, 1597, 1602, 1607, 1612, 1617, 1622, 1627, 1632, 1637, 1642, 1647, 1652, 1657, 1662, 1667, 1672 or 1677 and the use for Nilaparvata-specific infestations in plants.

Invention 156: claims 1-13,16-18 partially

as invention 1, but limited to Chilo-specific nucleotide sequences as characterized by SEQIDs 1682, 1684, 1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1704, 1730 to 2039, 2040, 2045, 2050, 2055, 2060, 2065, 2070, 2075, 2080, 2085, 2090 or 2095 and the use for Chilo-specific infestation in plants.

Invention 157: claims 1-13,16-18 partially

as invention 1, but limited to Plutella-specific nucleotide sequences as characterized by SEQIDs 2100, 2102, 2104, 2106, 2108, 2120 to 2338, 2339, 2344, 2349, 2354, or 2359 and the use for Plutella-specific infestations in plants.

Invention 158: claims 1-13,16-18 partially

as invention 1, but limited to Acheta-specific nucleotide sequences as characterized by SEQIDs 2364, 2366, 2368, 2370, 2372, 2384 to 2460, 2461 , 2466, 2471, 2476 or 2481 and the use for Acheta-specific infestations.

Invention 159: claims 14,15 completely

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Method for protecting an object from pest infestation, comprising treating said surface with a composition comprising the polynucleotides as identified in claims 1-3; wherein said object is selected from the group consisting of wood, tree, book binding, cloth, and a food-storage container.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2006/004008

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